

## Appendix G

S. Maslowski/USFWS



*Least tern*

# Land Protection Plan

- Introduction and Purpose
- Project Description
- Refuge Purpose
- Status of Resources to be Protected
- Threats to the Resource
- Action and Objectives
- Protection Options
- Land Protection Methods
- Service Land Protection Policy
- Funding for Fee or Easement Purchase
- Coordination
- Socioeconomic and Cultural Impacts
- Literature Cited



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Washington, D.C. 20240




In Reply Refer To:  
FWS/ANRS/052251

JAN 15 2013

### Memorandum

To: Regional Director, Region 5

From: Director 

Subject: Approval to Proceed with Publication and Distribution of the Final Planning Documents for the Expansion of the Nantucket National Wildlife Refuge, Nantucket County, Massachusetts

I approve your request dated September 28, 2012, to expand the current 21-acre Nantucket National Wildlife Refuge by up to 2,036 acres.

This request is based on the preferred alternative (Alternative B) in the Comprehensive Conservation Plan that was initiated for the refuge on April 7, 2008. Public participation was solicited during the planning process. Federal, State, and local governments, and private organization and citizens have provided input.

The Decision Package you submitted for my review included an Environmental Assessment, Land Protection Plan, and other related documents indicative of detailed planning. These documents comply with the requirements of the Director's land acquisition planning procedures memo dated August 11, 2000.

The lands targeted for protection will assist the refuge in addressing two priority conservation objectives: recovering listed threatened and endangered species and conserving Migratory Birds in decline.

Attachments

## Introduction and Purpose

This land protection plan (LPP) provides detailed information about the U.S. Fish and Wildlife Service's (Service, we, our) proposal to expand Nantucket National Wildlife Refuge (Nantucket NWR, refuge) on Nantucket, Massachusetts. This LPP identifies the proposed land protection boundary for the Nantucket NWR. Working with numerous partners, we delineated 2,036 acres of biologically significant land on the island of Nantucket. These acres are encompassed by the recommended acquisition boundary established in alternative B of the Nantucket NWR Draft Comprehensive Conservation Plan and Environmental Assessment (draft CCP/EA). We plan to protect these lands through transfers at no cost, fee-title acquisition, conservation easements, and management agreements. Of the total acreage, we recommend acquiring 206 acres in fee title through transfers at no cost, 17 acres in fee title through purchase, 1,117 acres in conservation easements, and 696 acres through management agreement.

The purposes of this LPP are to:

- 1) Provide landowners and the public with an outline of Service policies, priorities, and protection methods for land in the project area.
- 2) Assist landowners in determining whether their property lies within the proposed acquisition boundary.
- 3) Inform landowners about our long-standing policy of acquiring land only from willing sellers (we will not buy any lands or easements if the owners are not interested in selling).



*Nantucket National Wildlife Refuge*

Amanda Boyd/USFWS

This LPP presents the methods the Service and interested landowners can use to accomplish their objectives for wildlife habitat within the refuge boundary. The maps (G-1 through G-5) at the end of this document show the study area boundary and the land parcels in the preferred action area (i.e., as defined in alternative B of the EA/draft CCP). Table G.1 at the end of this document identifies each parcel, its tax map number, acreage, and our priority and recommended option for acquiring and protecting its habitat.

## Project Description

### Expand Refuge Land Protection Boundary

Nantucket NWR, located within the area known locally as “Great Point,” is part of the Eastern Massachusetts National Wildlife Refuge Complex (refuge complex). The refuge complex consists of eight refuges in eastern Massachusetts that are managed from the refuge complex headquarters at Great Meadows NWR in Sudbury, Massachusetts. Nantucket NWR is one of four refuges located on Cape Cod and the Islands; Monomoy, Nomans Land Island, and Mashpee NWRs are also part of the refuge complex. Nantucket NWR has been managed with formal and informal assistance from The Trustees of Reservations (TTOR) for several decades. Great Point is known as one of the best surfcasting locations in New England because of the riptide which brings bluefish and striped bass to the point. The refuge is also a destination for hundreds of visitors each year seeking to enjoy a Nantucket beach or a tour of the Great Point Lighthouse. Great Point is the destination for nearly 80 percent of the visitors who enter TTOR's Coskata-Coatue Wildlife Refuge. The proposed refuge expansion would protect a combination of wetland, upland, maritime dune, beach, and scrub-shrub habitat supporting migratory birds, federally listed and State-listed threatened and endangered species, and regionally significant wildlife and plant communities on Nantucket and associated islands.

Conservation of migratory bird, marine mammal, and threatened and endangered species' habitat within the proposed boundaries is one of the primary reasons for expanding the refuge and guiding its management. Bird species of particular concern include the federally and State-threatened piping plover (*Charadrius melodus*), federally and State endangered roseate tern (*Sterna dougallii*), and State-listed least tern (*Sterula antillarum*), American oystercatcher (*Haematopus palliatus*), and common tern (*Sterna hirundo*). Additional species include the federally endangered American burying beetle (*Nicrophorus americanus*), the New England cottontail (*Sylvilagus transitionalis*, candidate for Federal listing) and gray seal (*Halichoerus grypus*). These and other trust species are addressed individually below and grouped according to habitat.

### *Maritime Beach Habitats and Associated Species*

The Nantucket main island and adjacent Muskeget Island provide over 3,100 acres of maritime beach habitats that support nesting populations of piping plover, least tern, and American oystercatcher, and staging roseate and common terns. Muskeget Island also supports a large gray seal population. This proposal for land protection would allow improved management on over 1,200 acres of this habitat and provide an opportunity for the Service to work with partners to balance the needs of our trust resources with public use. Additional information on Federal trust species using maritime beach habitat on Nantucket and surrounding islands are discussed below.

**Piping Plovers.** Nantucket and the adjacent islands had 43 pairs of nesting piping plovers in 2010, which accounted for about 7 percent of the Statewide total population (Melvin 2011) and 2.4 percent of the 2010 Atlantic Coast population. Nesting data from 2011 are still being analyzed, but 56 pairs were preliminarily reported for 2011 (Jedrey 2012 personal communication) with reports of plovers using Muskeget Shoals during the post-breeding and migration season as well (Schulte 2012 personal communication). Increased habitat protection and management through acquisition and easements will help meet several recovery plan tasks including: monitoring the status and management at specific nesting sites (recovery task 1.1), reducing disturbance of breeding plovers from humans and pets (recovery task 1.3), reducing predation (recovery task 1.4), developing mechanisms to provide long-term protection, and protecting plovers during migration (recovery task 2.3) (USFWS 1994). Summaries of nesting piping plover numbers are included in the parcel descriptions for Coskata-Coatue Wildlife Refuge, Coatue Wildlife Refuge, Loran Station, and Muskeget Island.



Bill Byrne/USFWS

*Piping plover on nest*

the surrounding islands and shoals to post-breeding staging terns has become apparent. The post-breeding dispersal period is an especially sensitive time for terns because parental care may continue well into fall migration and even after arrival at their wintering areas (Ashmole and Tovar 1968, Nisbet 1976, Feare 2002, Hays et al. 2010). At fledging, young terns usually have not achieved adult mass, and several studies have demonstrated that post-fledging parental care given prior to departure from their breeding colony sites (Watson et al. 2012) provides for an increase in mass and later post-fledging survival probability (Feare 2002, Stienen and Brenninkmeijer 2002, Schaubroth and Becker 2008). During the post-breeding dispersal period, young terns start to transition to independence, learning skills needed to fish independently (Watson and Hatch 1999), and increasing body condition and strength of flight muscles needed for the 4,350-mile (7,000-kilometer) migration to South America. Much of the presumed recent reduction in post-fledging to first-breeding survival in roseate terns likely results from events that take place during this period (Spendlow et al. 2002). After an initial period of more widespread dispersal (Shealer and Kress 1994, Gochfeld et al. 1998), most, if not all (Spendlow et al. unpublished data), northwestern Atlantic roseate terns congregate at locations around Cape Cod and the offshore islands from Martha's Vineyard to Nantucket, Massachusetts

**Roseate and Common Terns.** While Nantucket Island has not recently supported many nesting common terns, or any nesting roseate terns (Mostello 2007, 2008, 2009, 2010, 2011), small numbers of common terns have periodically nested in the last decade (Mostello 2003, 2005, 2006, Blodgett 2002) and Muskeget Island was historically the largest roseate tern nesting site in North America (USFWS 1998). In recent years, the importance of Nantucket and



Kirk Rogers/USFWS

*The federally endangered roseate tern*



(Trull et al. 1999, Jedrey et al. 2010). During the staging period, terns use beaches free of human disturbance and near moving schools of forage fish (Blake 2010). Management of the parcels identified below will contribute to recovery by protecting an important historical nesting site (recovery tasks 1.2 and 1.3), and reducing disturbance at multiple staging sites (recovery tasks 2.1 and 2.2) (USFWS 1998). Developing a better understanding of roseate tern habitat, and factors limiting use, during the post-breeding staging period was identified as an important action for the northeastern population (USFWS 2010). Staging tern use is discussed in the parcel descriptions for Coskata-Coatue Wildlife Refuge, Coatue Wildlife Refuge, and Muskeget Island.

**Least Terns.** Least terns are a State-listed species of concern and are a high priority for Bird Conservation Region 30 (USFWS 2008). Least tern numbers in Massachusetts generally increased from 1985 to 2001, declined from 2001 to 2003, showed an increase in 2006 through 2008 (Mostello 2010), and have been decreasing since (information from 2011 is based on preliminary data from the 2010 and 2011 Massachusetts Coastal Waterbird Meeting in Barnstable, Massachusetts). In 2009, 45 percent of the State's least tern population could be found in three large colony sites (Mostello 2010) which increases the vulnerability of the State population. In 2011, Massachusetts hosted over 40 percent of the total 8,334 pairs of least terns nesting on the Atlantic Coast (O'Brien 2012 personal communication), and over 1,000 pairs were on Tuckernuck Island, Nantucket (Mostello 2012 personal communication). Within Massachusetts, the islands and shoals off of Nantucket are prime nesting and foraging sites for least terns. In 2010, Nantucket, Tuckernuck, and Muskeget Islands and shoals supported about 200 pairs of least terns (6 percent of a total 3,484 Statewide; Mostello 2011). In 2009 they supported 181 nesting pairs (5 percent of a total 3,569 pairs Statewide; Mostello 2010) and in 2008, they supported 484 pairs (13 percent of a total 3,776 pairs Statewide; Mostello 2009). Least terns are highly susceptible to abandonment due to predator pressures, but abandonment or localized shifts in colony sites can occur in response to flooding, changes in colony size, increased vegetative cover, and human activities as well (Kotliar and Burger 1986, Atwood and Massey 1988). This emphasizes the importance of protecting and managing multiple suitable sites for the long term.

Historically, least terns have also been reported at Great Point and Low Beach on Nantucket, and we anticipate that with appropriate management these two sites could potentially support colonies in the future. Summaries of nesting least tern numbers are included in the parcel descriptions for Coskata-Coatue Wildlife Refuge, Coatue Wildlife Refuge, Loran Station, and Muskeget Island.

Amanda Boyd/USFWS



*American oystercatcher*

**American Oystercatcher.** The American oystercatcher is a bird of conservation concern and is a species of highest priority in Bird Conservation Region 30 (USFWS 2008). The islands of Nantucket, Tuckernuck, and Muskeget collectively host 50 to 60 pairs of American oystercatchers each year, nearly one-third of the Massachusetts nesting population. These islands are one of the most important breeding areas in the Northeast for American oystercatchers in part because of high reproductive rates observed on the islands, apparently as a result of lower predation pressure. Reproductive rates for oystercatchers on Nantucket and adjacent islands average 0.55 chicks/pair, which contrasts to the 0.35 chicks/pair average in the rest of the State. When producing 0.55 chicks per pair the

population can increase, assuming constant levels of adult and sub-adult survival across the State (Schulte 2012 personal communication). Summaries of nesting and staging American oystercatcher numbers are included in the parcel descriptions for Coskata-Coatue Wildlife Refuge, Coatue Wildlife Refuge, and Muskeget Island.

**Seals.** In recent years, two areas in Nantucket have become a haul-out site for gray seals: Nantucket NWR and Muskeget Island. Gray seals were found along the northwestern Atlantic coast until the 17th century, and were considered locally extinct until the 1980s (see Wood 2009 for detailed accounts of seal numbers). While their pupping grounds are historically further north on Sable Island and in the Gulf of St. Lawrence in Canada, there has been a year-round breeding population around Cape Cod and associated islands since the late 1990s. In fact, Muskeget Island and the associated shoals supports the largest breeding population of gray seals in the United States (U.S.) and represents one of only two sites in Massachusetts where gray seals regularly pup.

The other site is Monomoy NWR. Though there is currently no estimate for the U.S. population, surveys conducted since their arrival in the 1980s indicate a steady increase in abundance in both Maine and Massachusetts, though it is unclear if this is due to population expansion or immigration (Waring et al. 2009). Even if the U.S. population is truly increasing, the increase in seal numbers on Nantucket may not reflect the degree of increase in the entire seal population; seals are using many other sites throughout the Northeast and surveys need to encompass all these areas to accurately reflect changes in the U.S. population.



Amanda Boyd/USFWS

*Grey seal*

### **Northeastern Beach Tiger**

**Beetle.** In 1990, the northeastern beach tiger beetle was listed as federally threatened. This tiger beetle is also a State-endangered species in Massachusetts. The loss of protected and undisturbed beaches has been cited as one of the primary reasons for the decline of this species (USFWS 1994a). The northeastern beach tiger beetle occurred historically in “great swarms” on beaches along the Atlantic Coast from Cape Cod to central New Jersey, and along the Chesapeake Bay beaches in Maryland and Virginia. Currently, there are only two populations in New England: one on Martha’s Vineyard and the other at Monomoy NWR/South Beach (USFWS 1994a, USFWS 2009).

This particular tiger beetle has been identified as an indicator species for healthy beach communities and its presence reflects positively on the ecological value of the habitats where it can be found. Preferred habitat is healthy, wild beach ecosystems that are highly dynamic, subject to natural erosion and accretion processes, and undisturbed by heavy human use (USFWS 1994a). These tiger beetles are unlikely to be found on beaches with intense coastal development, shoreline stabilization, or heavy recreational use. Reintroduction at appropriate locations within the historical range (recovery task 9) is identified as an important strategy in the Recovery Plan (USFWS 1994a). Muskeget Island currently has the best potential to support a reintroduction effort, if there is suitable habitat, since there is no offroad vehicle use.

**Seabeach Amaranth.** The last record of this federally threatened beach plant anywhere in the State of Massachusetts was from Nantucket in 1849 (USFWS 1996). The recovery plan focuses restoration efforts in the more southern portion of the historic range and adjacent to currently extant sites. However, there have been new populations discovered since the listing of the species in other states, and there is the potential that additional sites in the northern part of the historic range are appropriate for establishment of future populations of this species. Searching for additional populations (recovery task 1.2) and reestablishing populations in suitable habitat (recovery task 2.3) are both actions identified in the Recovery Plan (USFWS 1996). Muskeget Island in particular may be an appropriate site for establishing a population because there is no offroad vehicle use.

### ***Inland Scrub-shrub, Grasslands Habitats and Associated Species***

Inland scrub-shrub and grasslands make up a large proportion of Nantucket’s island habitat (33 percent) with approximately 59 percent of these early succession communities having some conservation protection. These habitats are important for at least two species that are a high priority for the Service: the federally endangered American burying beetle and the Federal candidate species New England cottontail. Coastal shrub habitats also provide critical feeding and resting areas for migrating landbirds which can rest and refuel on the abundance of nutritious berries during the fall migration period. On offshore islands, these refugia can be especially critical for migrants during their first migration (Smith et al. 2007). This has been demonstrated on other island stopover sites, including Block Island where over 100 species of landbirds have been documented during the fall migration, with 99 percent of them being first-year birds (Comings 2012 personal communication).

**American Burying Beetle.** The American burying beetle was first reintroduced to Nantucket at Eastern Moors in 1994, following its extirpation in the early 20th century. Release of captive bred beetles continued until 2006, and every beetle caught was provisioned with a quail carcass from 2007 to 2010. In 2011, provisioning was reduced to 25 pairs to assess the population's long-term viability. Although the population is not yet considered self-sustaining, there is evidence that numbers have continued to increase (LoPresti et al. 2011). Success of this effort will ultimately depend upon the size of the population that can be supported by Nantucket Island. This capacity will be determined by the amount of suitable carrion that is available, along with the amount of open habitats with loamy soils that provide suitable conditions for carcass burial. Because habitat on Nantucket Island is limited and isolated from other populations, stochastic events, such as drought or severe overwintering conditions, will likely play a role in determining the persistence of this population; therefore, resiliency of this population is dependent on habitat conditions on the island (Perrotti and Tur 2011 personal communication). This relationship between habitat, stochastic events, and population resiliency was discussed in the most recent 5-year review for the species where it was recognized that protection of large, minimally fragmented beetle-occupied habitats with abundant carrion is important to sustain extant populations in the event of “catastrophic losses or reduced carrying capacity in portions of the range” (USFWS 2008).

**New England Cottontail.** Although the last record of New England cottontail on Nantucket Island was approximately 30 years ago (Scarpitti 2012 personal communication), there is an abundance of shrub habitat that could support a population (Tur 2012 personal communication). Introduction of the eastern cottontail to Nantucket began in the late 1800s, and appears to have completely replaced the native New England cottontail (Johnston 1972). Habitat suitability models for the New England cottontail have identified numerous sites on Nantucket with features suitable for supporting the New England cottontail. Some of these sites rank among the top 6 percent rangewide for implementation of conservation actions. As such, the island has been identified as a focus area in the New England cottontail conservation strategy (Fuller et al. 2011). Survey efforts by the Nantucket Conservation Foundation (Foundation) and Massachusetts Division of Fish and Wildlife are ongoing to determine if a remnant population still occurs on the island. The results will provide a baseline assessment that will be used to inform specific management actions for Nantucket Island.



*New England Cottontail*

Nantucket Island also provides habitat for many State-listed plants and animals, including the State-threatened northern harrier (*Circus cyaneus*), State-endangered short-eared owl (*Asio flammeus*) and State-endangered peregrine falcon (*Falco peregrinus*), as well as several rare plants of special concern. Striped bass, bluefish, and other game fish are found near the Nantucket shoreline, as are flocks of thousands of seaducks, including common eider (*Somateria mollissima*) and all three scoter species (*Melanitta* spp.). These species of wildlife and fish benefit from the land protection work on Nantucket Island where nearly 45 percent of the island enjoys long-term protection through the work of many conservation organizations. To this end, the preferred action (the Service-preferred alternative B, the “Landscape-level Conservation and Cooperative Partnerships for Balanced Wildlife Management and Wildlife-Dependent

Recreation” from the draft CCP/EA) for the proposed expansion of Nantucket NWR establishes a land protection boundary of approximately 2,036 acres. This boundary was developed out of numerous meetings with conservation partners and came from a habitat review based on aerial photography and Geographic Information System (GIS) maps, and a familiarity with on-the-ground habitat features on the part of the local stakeholders.

## Refuge Purpose

The approximately 21-acre Nantucket NWR was established in 1973 when the Service acquired the property under An Act Authorizing the Transfer of Certain Real Property for Wildlife or other purposes from the U.S. Coast Guard (Coast Guard, (16 U.S.C. § 667b). The purpose for the establishment of the refuge is “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds....” 16 U.S.C. § 715d (Migratory Bird Conservation Act).



## Status of Resources to be Protected

The proposed refuge expansion area includes seven specific, disjunct parcels throughout Nantucket, which are described below.

### Great Point Lighthouse, Coast Guard

The Great Point Lighthouse is located within the refuge boundary on a 1-acre parcel of land that was transferred to the Coast Guard in 1987 to replace the original lighthouse that fell into the ocean as a result of erosion and the migration of the point westward. This is not an historic structure and the light is now automated. TTOR currently maintain the lighthouse structure under a license with the Coast Guard. Because this inholding is completely surrounded by refuge land, the Service is interested in acquiring the lighthouse property should the Coast Guard find it excess to their needs or should they wish for the structure to be owned by a different entity. Acquisition of this structure will also allow us to control vehicular traffic, which must cross the refuge to access the lighthouse. This would protect the beach/dune habitat which supports nesting piping plovers, least terns, and American oystercatchers; staging common and roseate terns; and loafing grey seals. We propose to acquire this property as a no-cost transfer for wildlife purposes from the Coast Guard.

### Coskata-Coatue Wildlife Refuge, The Trustees of Reservations

Coskata-Coatue's 1,117 acres stretch just beyond The Haulover north to the southern end of Nantucket NWR. Coskata-Coatue is known for its wildlife habitat, rare plants, and recreational value. Habitats include forested upland (consisting of maritime oak and a maritime red cedar savanna), wetlands, salt marsh, a unique salt marsh-maritime shrubland complex, the Great Point Lagoon, 200 acres of maritime dune complexes, and beaches. It offers a variety of public activities, including 16 miles of over-sand vehicle and walking trails, seasonal hunting, fishing opportunities, and guided natural history tours which include a stop at the Great Point Lighthouse. TTOR has expressed an interest to work with the Service to develop a permanent conservation easement so that the Great Point Peninsula could be managed as one wildlife refuge.

TTOR currently monitors and manages beach habitats used by nesting piping plovers, least terns, and American oystercatchers during the breeding season. From 1988 to 1995, the number of plovers on Great Point (the northern portion of TTOR's property and Nantucket NWR combined) ranged from 5 to 8 pairs



Chelsi Hornbaker/USFWS

*Children at the beach*

and productivity was good in most years (Jedrey 2012 personal communication). During the last 10 years, however, plover numbers have usually not exceeded 2 pairs (Melvin 2007, 2008, 2009, 2010, 2011; Melvin and Mostello 2003, 2007; Jedrey 2012 personal communication). On the rest of the Coskata-Coatue peninsula, the number of nesting piping plovers has ranged from 1 to 4 pairs, with an average of 1.5 pairs over the last 15 years and very variable productivity (Melvin and Mostello 2000, 2003, 2007; Mostello and Melvin 2001, 2002; Melvin 2007, 2008, 2009, 2010, 2011; Jedrey 2012 personal communication). Numbers of nesting least terns have fluctuated from 2006 to 2010 from a low of 3 pairs in 2010 to 185 pairs in 2008 (Mostello 2007, 2008, 2009, 2010, 2011). Coskata-Coatue has been very important for nesting American oystercatchers as well, with 9 to 10 pairs nesting collectively on Coskata West Beach, the Glades, and Great Point in 2009 to 2011 (Lang 2012 personal communication). Numbers have been even higher in some past years, with 19 pairs nesting in 2006 (Melvin 2007a).

Great Point, including Nantucket NWR, has also been identified as an important staging area on Nantucket for common and roseate terns. Seasonal closures on Nantucket NWR in recent years have supported an increased number of staging terns, and expanding the area that is managed could dramatically increase protection for terns during a very important window of time during the post-breeding staging period. South of the refuge, terns frequently use the sound-side west of Coskata Pond and the ocean-side of The Galls for staging. Consistent counts of staging terns have not been conducted annually south of the refuge on Coskata-Coatue, but surveys in 2009 revealed a high count of over 500 birds in mid-August (Jedrey 2012 personal communication), and anecdotal observations since then have often turned up counts of over 100 birds (Ray 2012 personal communication; Koch 2012 personal communication; Jedrey 2012 personal communication).

### Coatue Wildlife Refuge and the Haulover, Nantucket Conservation Foundation

The Coatue Wildlife Refuge contains over 390 acres of barrier beach that shelters Nantucket Harbor from the sound. With the exception of a few small private inholdings, this refuge is owned and managed for conservation purposes by the Foundation. The entire Coatue Wildlife Refuge is a barrier beach that is constantly shifting



and changing. The six points or “cusate spits” that form Coatue’s distinctive scalloped shoreline were formed and are maintained by wind, wave, and tidal action. The north shore, known as the “Chord of the Bay,” and the east facing ocean beach, take the brunt of strong winds and storm tides, which occasionally overwash the narrowest areas. Access to the Coatue Wildlife Refuge is limited to narrow, soft, sand roads that can only be traversed by foot or four-wheel drive vehicles. Coatue is considered part of a larger wildlife refuge system that includes 104 acres at The Haulover, which is also owned by the Foundation, the 916 acres (described above) of the Coatue Wildlife Refuge, owned by TTOR, and the approximately 21-acre Nantucket NWR. The Foundation has expressed an interest to work with the Service to develop a Management Agreement so that the entire peninsula (which begins at the Wauwinet Gatehouse and includes TTOR, Foundation, and Service property) could be managed as one wildlife refuge.



*Terns staging on Great Point*

Amanda Boyd/USFWS

The Foundation manages and monitors this property for coastal nesting waterbirds. Numbers of nesting piping plovers on Coatue from 1999 to 2006 were generally low, with only one pair nesting in many years (Melvin 2007; Melvin and Mostello 2000, 2003, 2007; Mostello and Melvin 2001, 2002). However, between 2007 and 2010, five to eight pairs of plovers nested each year, with good productivity in most years (ranging from 1.0 to 2.0 chicks fledged per pair; Melvin 2008, 2009, 2010, 2011). In 2011, nine pairs of piping plovers nested, but productivity was poor (Beattie 2012 personal communication). The increase in numbers in recent years may be due to several years of excellent productivity at Jetties Beach (just opposite Coatue Point to the west), and the lack of habitat for birds to expand into at that site (Beattie 2012 personal communication). The smaller Haulover area sometimes has an additional pair of nesting plovers (Melvin 2005 to 2010). Coatue is also very important for nesting American oystercatchers. From 2007 to 2011, 12 to 19 pairs of oystercatchers nested each year on Coatue (Beattie 2012 personal communication; Melvin 2010a). Small colonies of nesting least terns have been documented the past several years as well (Beattie 2012 personal communication). Coatue has also provided habitat for flocks of 20 to 30 post-breeding American oystercatchers on the sound side (Ray 2012 personal communication).



Bill Thompson

*Common eider*

#### **Nantucket Loran Station, Coast Guard**

The Nantucket Loran Station is being decommissioned because the Coast Guard closed the Loran system in February 2010. The Service proposes a Transfer of Real Property at no cost from the Coast Guard. Some of the buildings on the site could provide storage or housing for future refuge staff. The property totals approximately 85 acres in the Village of Siasconset, Massachusetts, and is split by Lower Beach Road which bisects the property.

The northern part of the property currently has an antenna tower with an access road to the antenna, and six houses on the southeast corner. This northern part of the property supports important maritime heathland habitat that has been identified as a priority natural community in Massachusetts

with a State ranking as S1 (i.e., less than five occurrences Statewide and considered especially vulnerable to extirpation). This community is also identified as a globally important community for preserving biodiversity and ecological processes (TNC 2006). In addition, there is a fairly large wetland complex that covers at least half the property. This habitat north of the road may be important to New England cottontail and is crucially important to American burying beetle. It also serves as an important stop-over site for migrating landbirds. Adjacent parcels have been ranked as among the top 50 to 200 sites for New England cottontail conservation in the State of Massachusetts (Fuller et al. 2011), though trapping has not occurred on this property. During surveys in 2010, 17 beetles were captured (including 13 new ones) at the Loran Station on the east side. Five dead beetles were also found. The beetles captured here were teneral adults looking for food before wintering, which confirms that this site is accessed by this species (McKenna-Foster 2010 personal communication; McKenna-Foster 2012 personal communication).

The southern portion of the property below Lower Beach Road is where the former antenna was located prior to being moved to the northern part of the property. There are two barrack-style buildings and the former antenna pad with a short access road. The habitat on the southern portion of the property is composed of beach and dune habitat. Surveys for nesting piping plovers at Low Beach were often grouped with the Tom Nevers area to the west and Siasconset to the north so it is difficult to separate numbers for this particular parcel. But, for all these sites, nesting numbers have been very low in recent years (zero to one pair from 2006 to 2010 and two pairs preliminarily reported in 2011). Low numbers at Low Beach are most likely a combination of erosion and loss of habitat, predators, and human disturbance (Ray 2012 personal communication). Low Beach also likely provides nesting habitat for least terns. State records generally group Low Beach with habitat to the north, but in 2008 and 2010, this general area supported 80 and 72 pairs of least terns respectively (Mostello 2009, 2011). Use of this area varies considerably between years however.



Piping Plover

Amanda Boyd/USFWS

### **Muskeget Island, Nantucket Land Bank and Privately Owned**

Muskeget Island lies west of Nantucket Island and northwest of Tuckernuck Island. The property totals approximately 306 acres (Town of Nantucket 2012) and supports maritime dune and beach habitats. In 2010, the Town of Nantucket placed a conservation restriction on their 119-acre portion of Muskeget Island (the western side) and then conveyed the property to the Land Bank. The rest of the island is owned by a single person and was also placed under a conservation restriction in 2010 (<http://www.nantucketlandbank.org/Documents/AnnualReportFY10-FullVersion.pdf>, accessed March 15, 2012).

Twenty-three species of wading birds, shorebirds, waterfowl, and passerines have nested on the island in the past. Muskeget Island especially provides important nesting habitat for coastal waterbirds. An average of 5.6 pairs/year of piping plovers has been documented over the last 5 years with good productivity in most years (Melvin 2008, 2009, 2010, 2011 and Jedrey 2012 personal communication). Although least tern habitat also exists at this site, no least terns nested here from 2006 to 2010 (Mostello 2007, 2008, 2009, 2010, 2011). However, 175 pairs of least terns nested late in the season in 2011 (Mostello 2012 personal communication). This site has also supported nesting American oystercatchers with 3 pairs nesting in 2006 (Melvin 2007a) and 2009 (Melvin 2010a). Four pairs nested in 2011 with high reproductive success and the adjacent and rapidly expanding Muskeget Shoal appears to be a prime emerging nesting site (Schulte 2012 personal communication). Nesting shorebird numbers may be underestimated in years when monitoring visits were made infrequently.

The shallow waters and shoals around Muskeget Island have been known to be important for foraging and staging terns for more than 40 years, with birds present from mid-July to mid-September, and numbers peaking in August (Veit 2012 personal communication). Muskeget Island was historically the largest roseate tern nesting site in North America (USFWS 1998) and it is likely these shoals were important for staging and foraging birds during that time. In more recent years, observers have seen high counts of 3,000 staging terns (40 percent of which were roseate terns) in August on a sandbar to the southwest of Muskeget Island (Spendelow 2012 personal communication). Although systematic, regular counts have not been conducted at this site due to difficulty in accessing the site, the extensive shoals and lack of human disturbance likely provide



reliable prime foraging and staging habitat for terns.

There are only three established pupping areas for gray seals in the U.S. Northwest Atlantic. Muskeget Island is the longest established and largest site of the three, and numbers there have been increasing since 1991 (Wood 2009). The pup count in 2008 was 2,095, which is roughly 80 percent of the 2,620 pups produced in all 3 colonies that year. While the population of the East Coast gray seal is currently increasing, the pupping grounds found on Muskeget are critical to maintain a stable population (Wood 2009). At various times of the year, gray seals use Muskeget Island as a haul-out site and as one of three pupping locations in the Northeastern United States. The sandy beach of this island may also be appropriate habitat for the federally threatened northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*) and the federally threatened seabeach amaranth (*Amaranthus pumilus*).



Muskeget Island

USFWS

#### Head of the Plains, General Services Administration (Formerly Federal Aviation Administration)

This parcel is located on the southwest side of Nantucket Island in Madaket. The property totals approximately 120 acres. The habitat consists of 30 to 40 percent grassland and 60 to 70 percent shrubland. This property is within an area designated as rare wildlife and plant species habitat by the Massachusetts Natural Heritage and Endangered Species Program. The State-listed special concern rare plants found on the property include sandplain blue-eyed grass (*Sisyrinchium fuscatum*), bushy rockrose (*Helianthemum dumosum*), and Nantucket shadbush (*Amelanchier nantucketensis*). These maritime heathland, grassland, and shrub habitats have been identified as globally significant and Tier 1 for protection of biodiversity and ecological processes in the North Atlantic Ecoregion (TNC 2006). There is also potential, existing, or historical habitat for the New England cottontail, and the parcel is ranked as a priority (#372) in the State for potential conservation actions (Fuller et al. 2011). The property is bounded by conservation lands owned by the Nantucket Land Bank and the Foundation. The Service is interested in acquiring this property through a no-cost transfer for wildlife purposes from the General Services Administration (GSA).

#### Lohmann/Jellame Property, Privately Owned

This property is an inholding on TTOR's Coskata-Coatue property, located close to the Nantucket NWR boundary. The property totals approximately 17 acres and is maritime dune habitat. There are two camps (seasonal houses) on the property. Because of the proximity of this property to the refuge, these camps could serve as seasonal refuge or partner housing.

### Threats to the Resource

The loss, alteration, and fragmentation of habitat all pose the greatest threats to wildlife throughout Nantucket. With increasing pressure for development, fragmentation might occur, breaking up large, contiguous blocks into smaller patches that are unsuitable for area-sensitive species. Preserving the large, contiguous blocks of habitat that remain in the town of Nantucket and maintaining their connectivity are crucial for the long-term viability of populations of area-sensitive wildlife, including species of raptors and passerines. Even large blocks already in conservation are at risk due to different practices within managing organizations. For example, TTOR, the Foundation, and the Service have protected the majority of Great Point Peninsula with the exception of several scattered parcels of private land. In order to maintain the important wildlife habitat, it is critical that these three groups protect the peninsula in a consistent manner. Early successional scrub-shrub and grassland habitats also require ongoing management to maintain them as suitable habitat for the species that are dependent on them.

White-tailed deer pose a significant threat to forest and shrubland health and forest regeneration on Nantucket Island's upland and wetland forests. High numbers of deer take refuge in residential areas or on public or private lands where hunting is not allowed or limited. Their overbrowsing can eliminate native shrub layers and





Tim Williams

*White-tailed deer*

damage breeding habitat for many species, particularly shrub-nesting birds. In addition, over-browsing can create an environment conducive for invasive plants germinating and crowding out native species, eliminating rare plant communities, and altering the composition and structure of these important habitats.

It is difficult to predict exactly how climate change and sea level rise will impact coastal beach and marsh systems. Without specific knowledge of how these habitats will shift and transition or persist, our best strategy is to protect these important habitats across the landscape. For example, providing protection at Cuskata-Coatue, Lower Beach, and Muskeget will provide beach nesting and roosting species with alternatives in a dynamic and changing landscape. In any given year, one beach may provide more suitable nesting habitat or access to foraging resources than another. Providing protection for several locations allows these unique coastal plain species to identify and utilize the best sites from year to year.

## Continuing Partnership Effort

The threats to the resource described above make preserving land throughout Nantucket both crucial and challenging. As real estate values increase due to the influx of people from across the country searching out vacation properties, the need to act quickly to preserve key parcels remaining on Nantucket and associated islands becomes more apparent. For that reason, we recognize the need to collaborate with other conservation organizations. Therefore, we would work to combine our efforts with those of many partners, such as TTOR, the Foundation, the Maria Mitchell Foundation, the Nantucket Land Bank, the Nantucket Land Council, the National Park Service, Massachusetts Division of Fisheries and Wildlife, and Massachusetts Audubon Society, as well as other partners yet to be identified. Many of our partners already own or have future plans to protect lands on Nantucket and associated island through fee-title and/or conservation easements. Still others have completed on-the-ground habitat restoration projects. These partners use their individual mission statements to focus protection and restoration efforts. Taken together, those mission statements cover the protection of shrubland, both federally listed and State-listed rare, threatened, and endangered species, scenic areas, wetlands, grassland habitats, and open space that the local community has identified as significant.

## Action and Objectives

### Land Protection Area

Working with numerous partners, we delineated 2,036 acres of biologically significant land on the town of Nantucket. The area contains portions of Nantucket's important defined ecosystems. In the final CCP, the Service concludes that acquiring identified habitat areas over time will also provide for the protection of rare and unique habitats. Land protection would also help many nongame species that continue to rely on the availability of ample and quality habitat. Additionally, this habitat complex would provide ample opportunities for wildlife-dependent recreation, new and dynamic partnerships, and scientific research.

### Maps and Ownership Table

Maps G-1 through G-5 and table G.1 show all land parcels within the acquisition boundary proposed in this LPP. We provided this information in the draft CCP/EA to inform landowners of our interest in lands in that area. We would acquire either full or partial interest in land parcels by fee purchase, as available, from willing sellers over time and as the availability of funding allows. We also plan to develop cooperative management agreements on other public lands in the project area.



Amanda Boyd/USFWS

*Common tern*

## Land Protection Priorities

All of the lands we include in the expansion proposal have significant resource values and high potential for ensuring habitat connectivity between the refuge and surrounding conservation lands. In general, the

availability of land from willing sellers, and the availability of funding at that time will influence the actual order of land protection. However, as landowners offer us parcels, and as funds become available, we will base the priority for land protection on several factors. Priority is assigned as follows:

**Priority 1:** Priority 1 parcels contain most of the lands and habitats that meet the threshold for Federal protection. They are:

- Parcels that contain a significant amount of functioning undisturbed or relatively undisturbed habitats of significant importance that support Federal trust species (e.g., federally listed species, migratory birds).
- Parcels that contain significant habitat for federally listed or candidate species.
- Parcels that border Nantucket NWR.
- Parcels that have a significant value for migratory birds, with prime nesting and foraging habitats for federally listed or State-listed species.
- Parcels that are currently under the ownership or jurisdiction of another Federal agency which provide facilities and/or habitat for federally listed or candidate species.

**Priority 2:** Priority 2 parcels are located throughout the preferred action area and contribute to meeting the threshold for Federal protection including:

- Parcels that are of significant importance to Nantucket.
- Parcels that help to restore or maintain habitat connectivity.
- Parcels that support State-listed rare species.
- Areas of high potential for habitat restoration or enhancement.
- Parcels that are currently under the ownership or jurisdiction of another Federal agency which will protect existing refuge lands and resources.
- Parcels of moderate value to a variety of migratory bird species or of significant value to a limited number of migratory bird species.

Our intention is to minimize the need to acquire residences and buildings on these lands, while protecting and restoring habitat, so parcels of this nature will be evaluated on a case-by-case basis. With the above criteria in mind, we configured our boundaries for fee and easement areas. The Service reserves the right to be flexible with the detailed priority list above, because a number of factors also influence the priority of land protection, including the availability of willing sellers and the availability of funding. In addition, the Service must be flexible in its methods and priorities of land protection to meet the needs of individual landowners.

## Protection Options

We will use the following options to implement this LPP:

- Option 1: Management agreements or land protection by others.
- Option 2: Less-than-fee acquisition by the Service.
- Option 3: Fee acquisition by the Service.

Service policy in acquiring land is to acquire only the minimum interest necessary to meet refuge goals and objectives, and acquire it only from willing sellers. Our proposal includes a combination of options 1, 2, and 3 above. We believe this approach offers a cost-effective way of providing the minimal level of protection needed to accomplish refuge objectives while also attempting to meet the needs of local landowners.

### Option 1. Management Agreements or Land Protection by Others

A great deal of land on Nantucket and associated islands is already owned by our partners or managed by our partners through conservation easements. It should also be emphasized that the protection of these lands fits well into a large landscape-scale wildlife and habitat corridor that is being pieced together in the area. The Service's land protection proposal to use management agreements would serve as an important keystone in this conservation effort. The following partners both manage and own properties that are ecologically associated with the Nantucket NWR:

- The Trustees of Reservations
- Nantucket Conservation Foundation
- Nantucket Land Bank
- Nantucket Land Council
- Massachusetts Audubon Society
- Town of Nantucket
- Local land trusts



Amanda Boyd/USFWS

*Greater black-backed gull chick*

### **Option 2. Less-than-fee Acquisition**

Under option 2, we will protect and manage land by purchasing only a partial interest, typically in the form of a conservation easement. This option leaves the parcel in private ownership, while allowing us control over the land use in a way that enables us to meet our goals for the parcel or that provides adequate protection for important adjoining parcels and habitats. The structure of such easements will provide permanent protection of existing wildlife habitats while also allowing habitat management or improvements and access to sensitive habitats, such as habitat for endangered species or migratory birds.

It will also allow for public use, where

appropriate. We will determine, on a case-by-case basis, and negotiate with each landowner, the extent of the rights we will be interested in buying. Those may vary, depending on the configuration and location of the parcel, the current extent of development, the nature of wildlife activities in the immediate vicinity, the needs of the landowner, and other considerations.

In general, any less-than-fee acquisition will maintain the land in its current configuration with no further subdivision. Easements are a property right, and typically are perpetual. If a landowner later sells the property, the easement continues as part of the title. Properties subject to easements generally remain on the tax rolls, although the change in market value may reduce the assessment. The Service does not pay refuge revenue sharing on easement rights. Where we identify conservation easements, we will be interested primarily in purchasing development and some wildlife management rights.

Easements are best when they meet at least one of the following criteria:

- Only minimal management of the resource is needed, but there is a desire to ensure the continuation of current undeveloped uses and to prevent fragmentation over the long term and in places where the management objective is to allow vegetative succession.
- A landowner is interested in maintaining ownership of the land, does not want it to be further developed, and would like to realize the benefits of selling development rights.
- Current land use regulations limit the potential for adverse management practices.
- Only a portion of the parcel contains lands of interest to the Service.

The determination of value for purchasing a conservation easement involves an appraisal of the rights to be purchased, based on recent market conditions and structure in the area. The Land Protection Methods section further describes the conditions and structure of easements.

### **Option 3. Fee Acquisition**

Under Option 3, we will acquire parcels in fee title from willing sellers, thereby purchasing all rights of ownership. This option provides us the most flexibility in managing priority lands, and ensures the protection in perpetuity of nationally significant trust resources.



Generally, the lands acquired by the Service will require more than passive management (e.g., controlling invasive species, mowing or prescribed burning, planting, or managing for the six priority public uses). We only propose fee acquisition when adequate land protection is not assured under other ownerships, active land management is required, or we determined the current landowner would be unwilling to sell a partial interest, such as a conservation easement.

In some cases, it may become necessary to convert a previously acquired conservation easement to fee acquisition. This may occur, for example, when an owner is interested in selling the remainder of interest in the land on which we have acquired an easement. We will evaluate that need on a case-by-case basis.



*Visitors enjoying the refuge*

Amanda Boyd/USFWS

## Land Protection Methods

We may use three methods of acquiring either a full or a partial interest in the parcels identified for Service land protection: (1) Purchase (e.g., complete title, or a partial interest like a conservation easement), (2) donations, or (3) exchanges and transfer of other Federal property.

### Purchase

For most of the tracts in the boundary, as indicated in Table G.1, the proposed method is listed as **Fee** or **Easement**. However, the method we ultimately use depends partly on the landowner's wishes.

**Fee** purchase involves buying the parcel of land outright from a willing seller in fee title (all rights, complete ownership), as the availability of funding allows.

**Easement** purchase refers to the purchase of limited rights (less than fee) from an interested landowner. The landowner would retain ownership of the land, but would sell certain rights identified and agreed upon by both parties. The objectives and conditions of our proposed conservation easements would recognize lands for their importance to wildlife habitat or outdoor recreational activities, and any other qualities that recommend them for addition to the National Wildlife Refuge System (Refuge System).

### Donation

We encourage donations in fee title or conservation easement in the approved areas. We are not currently aware of any formal opportunities to accept donations of parcels in our land protection boundary.

### Exchange

We have the authority to exchange federally owned land under Service management for other land that has greater habitat or wildlife value. Inherent in this concept is the requirement to get dollar-for-dollar value with, occasionally, an equalization payment. Exchanges usually do not increase Federal land holdings or require purchase funds; however, they also may be very labor-intensive and take a long time to complete.

### Transfer of Other Federal Property

We have the authority to work with other Federal agencies to have land transferred to the Service at no cost from other Federal agencies. These lands identified for transfer must support and benefit wildlife habitat.

## Service Land Protection Policy

Once a refuge land protection boundary has been approved, we contact neighboring landowners to determine whether any are interested in selling. If a landowner expresses an interest and gives us permission, a real estate appraiser will appraise the property to determine its market value. Once an appraisal has been approved and assuming funding is available, we can present an offer for the landowner's consideration.

Our long-established policy is to work with willing sellers, as funds become available. We will continue to operate under that policy.

Appraisals conducted by Service or contract appraisers must meet Federal as well as professional

appraisal standards. Federal law requires us to purchase properties at their market value, which typically is based on comparable sales of similar types of properties.

We based the land protection boundary on the biological importance of key habitats. This gives the Service the approval to negotiate with landowners that may be interested or may become interested in selling their land in the future. With those internal approvals in place, the Service can react more quickly as important lands become available. Lands in the boundary do not become part of the refuge unless their owners sell or donate them to the Service.



*Great Point*

USFWS



USFWS

*Grey seals*

A landowner may choose to sell land to the Service in fee simple and retain the right to occupy an existing residence. That is a "life use reservation." It applies during the seller's lifetime, but can also apply for a specific number of years. At the time we acquire the parcel, we would discount from the appraised value of the buildings and land the value of the term of the reservation. The occupant would be responsible for the upkeep on the reserved premises. We would own the land, and pay revenue sharing to the appropriate taxing authority.

In rare circumstances, at the request of a seller, we can use "friendly condemnation." Although the Service has a long-standing policy of acquiring land only from willing sellers, it also has the power of eminent domain, as do other Federal agencies. We use friendly condemnation when the Service and a seller cannot agree on property value, and both agree to allow a court to determine fair market value. When we cannot determine the rightful owner of a property, we also may use friendly condemnation to clear title. We do not expect to use friendly condemnation very often, if at all. We would not use condemnation otherwise, as it counters good working relations with the public.

## Funding for Fee or Easement Purchase

Much of our funding to buy land comes from the Land and Water Conservation Fund (LWCF), which derives from certain user fees, the proceeds from the disposal of surplus Federal property, the Federal tax on motor boat fuels, and oil and gas lease revenues. About 90 percent of this fund now derives from Outer Continental Shelf oil and gas leases. The Federal Government receives 40 percent of this fund to acquire and develop nationally significant conservation lands. Another source of funding to purchase land is the Migratory Bird Conservation Fund, which derives from Federal Duck Stamp revenue. We plan to use LWCF funds to buy either full or partial interests in lands in the project area.

## Coordination

Throughout the planning process for the proposed expansion at Nantucket NWR, we worked with conservation partners to determine the best ways to ensure that federally listed species, such as the American burying beetle, piping plover and roseate tern; candidate species, such as the New England Cottontail; and other species of management concern, including migratory birds, are protected on Nantucket and associated islands. We met with conservation organizations and land managers to determine the best ways the Service could further contribute to land protection and management. There are already a number of conservation ownerships on Nantucket, and the intention of the Service is to bring a landscape-level perspective to the conservation of key species and habitats on Nantucket, and to be able to share our expertise and expand the reach of our resources to other parcels that will further the mission of the Refuge System. As a result of our conversations and onsite meetings, we developed the protection options outlined earlier in this document. We will use a combination of no cost transfers, fee title acquisition, conservation easements, and management agreements to achieve mutually-held objectives. In particular, TTOR, the Foundation, Nantucket Land Bank, and Nantucket Land Council believe that the Service has an important role to play in the further conservation and management of Nantucket's wildlife resources. We did provide the draft CCP/EA for public review and comment, and we carefully considered public comments on Service land protection. We have strong support from Nantucket's major conservation organizations and some individuals for this proposal. The town of Nantucket does not feel that plans to expand the refuge to other parts of the island, outside the Coskata-Coatue Peninsula, are appropriate at this time. There is also some local opposition to our land protection proposal.



*Herring gull at Nantucket National Wildlife Refuge*

USFWS

## Socioeconomic and Cultural Impacts

We do not predict any significant adverse socioeconomic or cultural impacts. We believe a net positive benefit will result for the local community. Nantucket will benefit from increased refuge revenue sharing payments and lower potential costs from these parcels, savings on the cost of community services, increased property values, increased watershed protection, maintenance of scenic values, and increased revenues for local businesses from refuge visitors who participate in bird watching, hunting, and wildlife observation.

Nantucket voters have consistently supported additional land protection. Land protection by the Service, while aimed at protecting Federal trust resources, watersheds, and other natural resource values, would also maintain the rural island character of Nantucket. Local reaction to proposed development on Nantucket tends to be negative.

One concern we heard expressed about Service land protection was the likelihood of reduced public access. We would review all existing public uses on lands that we acquire and will promote the six priority wildlife-dependent uses of the Refuge System, including hunting, fishing, wildlife observation and photography, and environmental education and interpretation as compatible on any land that we acquire in fee title. Other uses may also be permitted provided they are appropriate and compatible with the purposes of the refuge and the mission of the refuge system.



Refuge lands will also increase protection for cultural resources in the area. Service ownership will protect known cultural sites against vandalism, and protect unidentified or undeveloped cultural sites from disturbance or destruction. Our interpretation and environmental education programs will continue to promote public understanding and appreciation of Nantucket's rich cultural resources.

**Table G.1. Proposed Nantucket NWR Land Protection Parcel List.**

<b>Parcel</b>	<b>Municipality</b>	<b>Deed Acres</b>	<b>Acquisition Priority</b>	<b>Acquisition Methods</b>	<b>Current Ownership</b>
Great Point Lighthouse	Nantucket	1	2	Fee title ownership (no-cost transfer)	Coast Guard
Coskata-Coatue	Nantucket	1,117	1	Easement (purchase or donation)	The Trustees of Reservations
Coatue	Nantucket	390	1	Management Agreement	Nantucket Conservation Fund
Loran Station	Nantucket	85	1	Fee title ownership (no-cost transfer)	Coast Guard
Muskeget Island	Nantucket	306	1	Fee Title ownership (acquisition or donation), Easement (purchase or donation), or Management Agreement	Private and town of Nantucket
Head of the Plains	Nantucket	120	2	Fee title ownership (no-cost transfer)	General Services Administration (formerly Federal Aviation Administration)
Lohmann/Jellame	Nantucket	17	2	Fee Title (acquisition or donation)	Private

Map G-1. Great Point—Coscata Area



Map G-2. Coatue Area





Map G-3. U.S. Coast Guard Nantucket Loran Station Property



Map G-4. Former FAA—Head of the Plains Property





Map G-5. Muskeget Island





## Literature Cited

- Atwood, J.L. and B.W. Massey. 1988. Site fidelity of least terns in California. *The Condor* 90:389-394.
- Ashmole, N.P., and H.S. Tovar. 1968. Prolonged parental care in Royal Terns and other birds. *Auk* 85:90-100.
- Beattie, K. 2012. Nantucket Conservation Foundation, Inc., Nantucket, Massachusetts. Personal communication. March 2012.
- Blake, K. A. 2010. Roseate (*Sterna dougallii*) and Common Tern (*S. hirundo*) Use of Staging Sites during the Post-breeding Period in Coastal Massachusetts. Masters thesis, Antioch University New England, Keene, NH.
- Blodget, Bradford G. 2002. Massachusetts Tern Inventory 2001. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Comings, S. 2012. The Nature Conservancy, Block Island, Rhode Island. Personal Communication.
- Feare, C.J. 2002. Influence of date and body mass at fledging on long-term survival of Sooty Terns (*Sterna fuscata*). *Marine Ornithology* 30:46-47.
- Fuller, S. E., K. Callahan, and T. Boucher. 2011. Designing conservation for the New England cottontail (*Sylvilagus transitionalis*): habitat models and decision support tools. Draft. Weare, NH.
- Gochfeld, M., J. Burger, and I.C.T. Nisbet. 1998. Roseate Tern (*Sterna dougallii*). In *The Birds of North America*, No. 370 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
- Hays, H., G. Lugo, and G. Cormons. 2010. Puerto Rico – stopover for migrating Roseate Terns. *North American Bird Bander* 35:127-131.
- Jedrey, E. 2012. Massachusetts Audubon Society. Cummaquid, Massachusetts. Personal Communication. March 2012.
- Jedrey, E.L., R.J. Harris, and E.A. Ray. 2010. Roseate Terns – citizens of the world: the Canada to Cape Cod connection. *Bird Observer* 38:146-150.
- Johnston, J. E. 1972. Identification and distribution of cottontail rabbits in southern New England. University of Connecticut, Storrs, CT.
- Koch, S. 2012. U.S. Fish and Wildlife Service, Sudbury, Massachusetts. Personal Communication.
- Kotliar, N.B. and J. Burger. 1986. Colony site selection and abandonment by least terns (*Sterna antillarum*) in New Jersey, USA. *Biological Conservation* 37:1-21.
- Lang, D. 2012. The Trustees of Reservations, Nantucket, Massachusetts. Personal communication. April 2102.
- LoPresti, E., A. McKenna-Foster, L. Perrotti, and J.A. Blyth. 2011. American Burying Beetle (*Nicrophorus americanus*) survey on Nantucket Island, Massachusetts, 2011. Submitted to USFWS, Region 5, October 2010.
- McKenna-Foster, A. 2010. Maria Mitchell Association, Nantucket, Massachusetts. Personal communication. September 2010.
- McKenna-Foster, A. 2012. Maria Mitchell Association, Nantucket, Massachusetts. Personal communication. March 2012.
- Melvin, S. M. 2007. Summary of 2006 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S. M. 2007a. Summary of 2006 census of American oystercatchers in Massachusetts. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S. M. 2008. Summary of 2007 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S. M. 2009. Summary of 2008 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S. M. 2010. Summary of 2009 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.

- Melvin, S. M. 2010a. Summary of 2009 census of American oystercatchers in Massachusetts. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S. M. 2011. Summary of 2010 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S. M. and C. S. Mostello. 2000. Summary of 1999 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S. M. and C. S. Mostello. 2003. Summary of 2002 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Melvin, S.M. and C. S. Mostello. 2007. Summary of 2003 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. 2003. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2002. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. 2005. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2004. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. 2006. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2005. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, Carolyn S. 2007. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2006. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. 2008. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2007. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. 2009. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2008. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. 2010. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2009. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. 2011. Inventory of terns, laughing gulls, and black skimmers nesting in Massachusetts in 2010. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. 2012. Massachusetts Natural Heritage and Endangered Species Program. Westborough, Massachusetts. Personal Communication. March 2012.
- Mostello, C. S. and S. M. Melvin. 2001. Summary of 2000 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Mostello, C. S. and S. M. Melvin. 2002. Summary of 2001 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, MA.
- Nisbet, I.C.T. 1976. Early stages in post-fledging dispersal of Common Terns. *Bird-Banding* 47:163-164.
- O'Brien, K. 2012. U.S. Fish and Wildlife Service. Wells, Maine. Personal Communication. March 2012.
- Perrotti, L. 2011 Roger Williams Park Zoo, Providence, Rhode Island. Personal Communication, December 2011.
- Ray, E. 2012. Nantucket, Massachusetts. Personal Communication.

- Scarpitti, D. 2012. Massachusetts Division of Fisheries and Wildlife, Westborough, Massachusetts. Personal communication. March 2012.
- Schauroth, C., and P.H. Becker. 2008. Post-fledging body mass increase in Common Terns (*Sterna hirundo*): influence of age, sex, and year. *Ibis* 150:50-58.
- Schulte, S. 2012. Massachusetts Manomet Center for Conservation Sciences. Manomet, Massachusetts. Personal Communication. January 2012.
- Shealer, D.A., and S.W. Kress. 1994. Post-breeding movements and prey selection of Roseate Terns at Stratton Island, Maine. *Journal of Field Ornithology* 65:152-154.
- Smith, S. S., K. H. McPherson, J. M. Backer, B. J. Pierce, D. W. Podlesak, and S. R. McWilliams. 2007. Fruit quality and consumption by songbirds during autumn migration. *The Wilson Journal of Ornithology* 119(3):419-428, 2007.
- Spendelow, J. U.S. Geological Survey, Laurel, Maryland. Personal communication. May 2012.
- Spendelow, J.A., J.D. Nichols, J.E. Hines, J.-D. Lebreton, and R. Pradel. 2002. Modelling post-fledging survival and age-specific breeding probabilities in species with delayed maturity: a case study of Roseate Terns at Falkner Island, Connecticut. *J. Applied Statistics* 29:385-405.
- Steinkamp, M. 2008. New England/Mid-Atlantic Coast Bird Conservation Region (BCR 30) Implementation Plan. Atlantic Coast Joint Venture. 251pp.
- Stienen, E.W.M., & A. Brenninkmeijer. 2002. Variation in growth in Sandwich Tern chicks (*Sterna sandvicensis*) and the consequences for pre- and post-fledging mortality. *Ibis* 144:567-576.
- The Nature Conservancy. 2006. The North Atlantic Coast Ecoregional Assessment *prepared by* the North Atlantic Coast Team. 126 pp. Accessed online June 2012 at: <http://conserveonline.org/library/NAC%20Ecoregional%20Plan.doc>
- Town of Nantucket. Appraisal Vision Online Database. Nantucket, Massachusetts. May, 2012.
- Trull, P., S. Hecker, M.J. Watson, and I.C.T. Nisbet. 1999. Staging of Roseate Terns (*Sterna dougallii*) in the post-breeding period around Cape Cod, Massachusetts, USA. *Atlantic Seabirds* 1:145-158.
- Tur, T. 2012. U.S. Fish and Wildlife Service, Concord, New Hampshire. Personal communication. April 2012.
- U.S. Fish and Wildlife Service. 1994. Northeastern Beach Tiger Beetle (*Cicindela dorsalis dorsalis* Say) Recovery Plan. Hadley, Massachusetts. 60 pp.
- U.S. Fish and Wildlife Service. 1996. Recovery Plan for Seabeach Amaranth (*Amaranthus pumilius*). Atlanta, Georgia.
- U.S. Fish and Wildlife Service. 1996. Piping Plover (*Charadrius melodus*), Atlantic Coast Population, Revised Recovery Plan. Hadley, Massachusetts. 258pp. <http://www.fws.gov/northeast/pipingplover/recovery.html> (accessed March 2011).
- U.S. Fish and Wildlife Service. 1998. Roseate Tern (*Sterna dougalli*), Northeastern Population Recovery Plan, First Update. Hadley, Massachusetts. 82pp.
- U.S. Fish and Wildlife Service. 2008. Five-Year Review: Summary and Evaluation for American Burying Beetle (*Nicrophorus americanus*). New England Field Office. Concord, New Hampshire. 53pp.
- U.S. Fish and Wildlife Service. 2009. Northeastern Beach Tiger Beetle. (*Cicindela dorsalis dorsalis*). 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service. Virginia Field Office. Gloucester, Virginia. 21pp.
- U.S. Fish and Wildlife Service. 2010. Five Year Status Review for Roseate Tern. Hadley, Massachusetts.
- U.S. Fish and Wildlife Service. 2011. Abundance and Productivity Estimates - 2010 Update, Atlantic Coast Piping Plover Population. [www.fws.gov/northeast/pipingplover](http://www.fws.gov/northeast/pipingplover). Accessed May 2012.
- Veit, D. 2012. City University of New York, Staten Island, New York. Personal communication. May 2012.
- Watson, M.J., and J.J. Hatch. 1999. Differences in foraging performance between juvenile and adult Roseate Terns at a pre-migratory staging area. *Waterbirds* 22:463-465.
- Watson, M.J., J.A. Spendelow, and J.J. Hatch. 2012. Post-fledging brood and care division in the Roseate Tern (*Sterna dougallii*). *Journal of Ethology* 30:29-34.